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EXAMINER

SHAHRESTANI, NASIR

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

DETAILED ACTION

Response to Arguments

Applicant's arguments with respect to claims 11-22, 24-28, 31, 32, 34-45, 47-50, 52-61, 63-65 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 102

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 11, 13 and 40 are rejected under 35 U.S.C. 102(e) as being anticipated by Awano et al. (U.S. 2004/0027928 A1).

Awano et al. teach at least a first magneto-optical element (elements 11, 12, 13) that exhibits a response, in the form of a faraday rotation (par. 0026), to an applied magnetic field, a hysteresis characteristic (par. 0091 - illustrating strength in Kerr rotation) of the Faraday rotation exhibiting transition regions between a plurality of stable states (par. 0014 and 0065); a light source (laser source – fig. 9), to emit light that impinges on the first magneto-optical element; a modulation element (magnetic field modulation system – par. 0037), comprising a coil (par. – 03), adjacent to the first magneto-optical element, the modulation element being a source of a time varying magnetic field of sufficient strength to switch the first magneto-optical element between the stable states; and a detector (par. 0026), configured to detect a change in the light caused by a reaction of the first magneto-optical element to magnetic field of a subject (a second magneto-optical layer), the change occurring when the first magneto-optical element is in one of the transition regions (par. 0050).

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Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 14-21, 25-28, 34-39, 41-45, 47-49, 52, 53, 59-64 are rejected under 35 U.S.C.

103(a) as being unpatentable over Awano et al. (U.S. 2004/0027928 A1) in view of Nagai (U.S. 7,075,055 B2).

Awano et al. teach all the elements of claims 11, 13 and 40 as described above but do not teach structural specifics of shielding mechanisms, platform, as well as detector apparatus as outlined in claims 14-21, 25-28, 34-39, 41-45, 47-49, 52, 53 and 59-64.

Nagai teaches a measuring device comprising a first magneto-optical medium (structure 48); a light source (element 2201) to emit light that impinges on the magneto-optical element; a detector (claim 1) configured to detect a change in the light caused by a reaction of the first magneto-optical element to a magnetic field of a subject. Nagai further teaches providing a permalloy film (col. 29 lines 42-67) and means to order remove background noise to observe clear magnetized distribution. Nagai further teaches providing a shielding film (element 2106) which provides general shielding of all components from electromagnetic radiation. Nagai teaches a pattern generator (element 706) which inputs a trigger signal (element 707) synchronized with the pattern signal to a delay circuit (element 705). The laser driver (element 712) generates a drive pulse (element 713) by the inputted trigger (element 711) to drive a semiconductor laser (element 714) with a pulse (see fig. 7). Nagai further teaches a platform

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(sample stage 2205) for the system which can be construed to provided some degree of vibration isolation. Nagai further teaches a liquid crystal spatial phase modulator (element 1501).

It would have been obvious to one of ordinary skill in the art at the time of invention to have modified Awano et al. and to have integrated the teachings of Nagai in order to provide a stable testing platform and detection apparatus that would enable the procedures of Awano to take place with improved results.

Nagai clearly teaches the use of thin films in various configurations (fig. 20A, 20B, 20C) which are utilized as magneto-optical elements within the system. Awano and Nagai do not teach the use of two magneto-optical within the system.

It would have been obvious to one of ordinary skill in the art at the time of invention to have modified Awano in view of Nagai and to have provided another magneto-optical film element, since the mere duplication of parts is not patentable significance unless a new and unexpected result is produced.

Furthermore, Nagai does not specifically teach the use of a single nonmagnetic frame upon which optical components of the detection apparatus are mounted however such a modification would only require routine skill in the art and hence it would have been obvious to one of ordinary skill in the art at the time of invention to have modified Awano in view of Nagai and to have provided a nonmagnetic frame for mounting in order minimize interference due to magnetic fields of the system.

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Claims 22, 24 and 50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Awano et al. (U.S. 2004/0027928 A1) and further in view of Matsushita et al. (U.S. 2002/0149832 A1).

Matsushita et al. teach a faraday rotator (see title) wherein a multilayer film type is provided in which satisfactory optical characteristics are obtained with a small number of layers (abstract). Matsushita et al. further teach the availability of YIG bulk single crystal, about 2mm in thickness (par. 0006).

It would have been obvious to one of ordinary skill in the art at the time of invention to have modified Awano et al. and to have provided another type of magneto-optical film element, such as YIG as taught by Matsushita et al. in order provide for an optimized film element.

Claims 54-58 are rejected under 35 U.S.C. 103(a) as being unpatentable over Awano et al. (U.S. 2004/0027928 A1) and further in view of Tsukada et al. (U.S. 2002/0173714 A1).

Awano et al. teach all the limitations of claim 40 but do not teach the measurement of magnetic fields from the heart.

Tsukada et al. teach a system wherein magnetic fields of the heart are measured (Figs. 25A, 25B, and 25C).

It would have been obvious to one of ordinary skill in the art at the time of invention to have modified Awano et al. and to have included the known means of measuring the magnetic field of the heart in order to provide mappings for diagnostic purposes.

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Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to NASIR SHAHRESTANI whose telephone number is (571)270-1031. The examiner can normally be reached on Mon.-Thurs: 7:30-5:00, 2nd Friday: 7:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Casler can be reached on 571-272-4956. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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